DOCUMENT RESUME

ED 029 796 24 SE 006 819

By-Welser, John R.

An Evaluative Investigation of Silent Loop Films in the Teaching of Anatomy, Final Report.

Purdue Univ., Lafayette, Ind.
Spons Agency-Office of Education (DHEW), Washington, D.C. Bureau of Research.
Bureau No-BR-7-E-143
Pub Date Apr 69
Grant-OEG-0-8-014300-0206-010
Note-68p.
EDRS Price MF-$0.50 HC-$3.50
Descriptors-*Anatomy, Biology, *College Science, Comparative Analysis, *Conventional Instruction, *Filmstrips, *Instruction, Instructional Media, Zoology

Investigated were (1) the acceptance and effectiveness of silent film loops as a teaching and review aid, (2) the possible substitution of loop films for prosected and/or fresh dissection materials, and (3) the comparative costs of loop films used in the presentation of five units of a gross anatomy course and six units of an applied anatomy course. The students in each of the two classes were divided into three randomly selected groups. Differences between the treatment groups were evaluated utilizing objective tests, student opinion questionnaires, time records, instructional costs, and loop film production costs. Results for the anatomy units indicated (1) there were no significant difference apparent between treatment groups immediately following the presentation of a subject unit, (2) the addition of film loops to a method of presentation appeared to aid retention, (3) a savings of time was apparent for the treatment group having loops as their guide in a technique-oriented exercise, (4) students liked the loops as aid but had doubts about their effectiveness as a primary means of instruction, (5) there were no significant differences in achievement as a result of the different procedures, (6) students preferred the film loops for review over active dissection or viewing the prosected cadavers. (RS)

FINAL REPORT

Project No. 7-E-143

Grant No. OEG-0-8-014300-0206-010

AN EVALUATIVE INVESTIGATION OF SILENT LOOP FILMS IN THE TEACHING OF ANATOMY

April 1969

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

Final Report

Project No. 7-E-143

Grant No. OEG-0-8-014300-0206-010

An Evaluative Investigation of Silent Loop Films In the Teaching of Anatomy

John R. Welser
Purdue University
West Lafayette, Indiana

April 1969

The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgement in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

The author wishes to recognize the contribution of ability, time and effort of: Professor Algernon R. Allen, Director of Medical Illustration, School of Veterinary Science and Medicine, Purdue University, in the production of loop films and Professor Allen R. Starry, Director, Measurement and Research Center, Purdue University, in the analysis of data.

SUMMARY

In the future, veterinary anatomy will be taught to more students in less time with a shortage of qualified staff. The number of prosected and fresh dissection specimens that can be made available for student study is limited by both time and money. Silent super 8 mm "single concept" loop films may help alleviate some of the problems and serve as a valuable teaching aid in medical schools.

We felt that loop films were effective teaching aids; however, more definite data was needed before further expansion of production of loop films could be undertaken. The objectives of this project were: (1) To evaluate the acceptance and effectiveness of silent loop films as a teaching and review aid, (2) To determine whether loop films could be substituted for prosected and/or fresh dissection materials, and (3) To compare the economy of loop films to prosected and fresh dissection materials.

"Single concept" loop films were used in the presentation of five units of the gross anatomy course and six units of the applied anatomy course. The students in each of the two classes were divided into three randomly selected groups. In basic anatomy the acceptance and effectiveness of loop films as a primary teaching tool and as a substitute for the prosected guide cadaver was tested. The subject matter was presented to treatment group one in the conventional manner (dissection guide, prosected cadaver, student dissection of a cadaver), with treatment group two the loop films were substituted for the prosected cadaver, and with treatment group three loop films were substituted for both the prosected cadaver and student dissection. In applied anatomy, the acceptance and effectiveness of loop films as review aids and whether or not loop films could be substituted for fixed or fresh prosections were evaluated. The review material was presented to group one using loop films and a handout, to group two with a prosected fixed cadaver plus a handout and to group three with a prosected fresh cadaver plus a handout. Differences between the treatment groups in both basic and applied anatomy were evaluated utilizing objective tests, student opinion questionaires, time records, instructional costs and loop film production costs.

In the basic anatomy units, no significant differences were apparent between treatment groups immediately following presentation of a subject unit; however, the addition of loop films to a method of presentation appeared to aid retention in this study. A saving of time was apparent for the treatment group having loop films as their guide in a technique oriented exercise. The students felt that loop films were extremely useful in the correlation of structure with function and as review aids. They also felt that loop films were good teaching aids and could serve as a substitute for the prosected cadaver. However, the students expressed doubts about the effectiveness and a strong dislike for loop films as a primary teaching tool (as a substitute for dissection).

In applied anatomy, analyses revealed that the different methods of treatment resulted in no significant differences in achievement. Student opinion indicated that super 8 mm loop films were preferred for review

over active dissection or viewing the prosected fixed cadavers and could serve as a substitute for the prosected fresh cadaver. As a review aid loop films will save either the instructor's time in preparation or the student's time in dissection.

If loop films are used two to three times per year to replace cadavers, they are relatively inexpensive. However, considering the time involved to make a good loop film, decisions concerning the most relevant subjects for loop films must be made. As a result of this study, loop films which we produce in the future will be in the areas that correlate structure with function or films which will serve as review aids.

INTRODUCTION

The fast increasing volume and complexity of material to be learned in modern veterinary science, as in other fields, requires more efficient and improved teaching techniques. Historically, anatomy has occupied a central position in the veterinary curriculum; however, due to the advancement of the other preclinical and clinical sciences and the resulting change in emphasis, this is no longer true. It was recommended, for example, at the Second FAO/WHO International Meeting on Veterinary Education that, in the interest of saving instructional time, anatomy teaching should be further reduced from its present average of 650 to 480 instructional hours(1). Such reductions seem likely to be adopted.

Despite efforts to recruit and train larger numbers of veterinary anatomists, demand in this country continues to exceed the supply. At the 1966 American Association of Veterinary Anatomists Meeting, Venzke(2) reported that there was an average shortage of 1.5 PMY per department. The number of veterinary school graduates has risen from 192 in 1948 to 860 in 1965, with a majority of the increase coming from admission of more students into the existing professional schools. This trend is expected to continue(3). Therefore, in the future, veterinary anatomy will be taught to more students in less time and with a continuing shortage of qualified staff. It is necessary to analyze and evaluate carefully the customary and the new approaches to anatomical teaching, as well as the time requirements and effectiveness of each.

At the School of Veterinary Science and Medicine, Purdue University, the teaching of veterinary gross anatomy closely parallels the program at 16 of the other 18 veterinary schools(4). A basic anatomy course is taught to first year professional students, followed by an applied anatomy course which is taught to third year professional students. To date, both courses have relied heavily on prosected and fresh dissection materials to aid in the presentation of anatomy. Prosected specimens have the disadvantages of lacking natural color, of smelling strongly of formalin, of being time consuming to prepare, and of having to be renewed every two years or so. Fresh specimens, while having the natural color and consistency, are very short-lived. With the advent of new legislation, dogs for fresh dissection are becoming more difficult to obtain and more expensive. The price has risen from $5.00 to $50.00 a piece for a 6 month old dog. Cows, pigs, and horses which we must use for comparison of anatomical structure have increased substantially in price due to the increase in beef and pork prices and the increased popularity of pleasure horses. Thus, both time and money limit the number of prosected and fresh dissected specimens available for each class period.

RELATED RESEARCH

Much of medicine is visual or visualizable and is concerned basically with the material from which motion pictures are made. Earlier research in the use of educational films has shown them to be effective in teaching and that they may permit the saving of time. Stein(5), for example, reported no significant difference between students who were taught typing by using 16 mm film loops and students taught conventionally. Similar results were reported by Vander Meer(6) in a study conducted with 9th graders and by Snow(7) who compared filmed vs. live physics lecture demonstrations. Vander Meer(8) also reported that good films can be used as the sole means for teaching some kinds of factual material and performance skills. Film loops can aid inexperienced instructors or can reduce the burden on experienced instructors. Harby(9) found that film loops projected in daylight proved as effective as live instructor demonstrations in the teaching of simple skills, and Murnin(10) reported that using loop films, an instructor with a minimum amount of training and experience can teach skills effectively. It has been shown by Rimland(11) that repetition of a film results in substantial increments in learning. If a film is short, it can be repeated more easily and according to Ruhe(12), "short films better answer the emotional and intellectual needs of individualistic medical staff instructors than do conventional long teaching films." Leveridge(13) reported that by showing and discussing films, the instructor can do a better job of teaching than he can possibly do in describing a phenomenon verbally. Thus it appears that short silent films that can be discussed, that permit repetition, and are economical to produce would be of great service in teaching anatomy, just as in other instructional fields. Silent 8 mm "single concept" loop films appear to answer the above requirements and lend themselves well to teaching in medical schools.

The Single Concept Teaching Film Conference for Medicine(20) revealed the familiar group use of film in medical instruction and stressed individual and small group use of films for self instruction. Markee(14) reported the successful long term use of short 16 mm films in the teaching of anatomy at Duke University. Huber(15) pointed out that the motion of models and specimens in a motion picture gives the viewer the impression of depth which is an important factor in the study of anatomy. Ham(16) suggested that movies have their greatest success if they are brief and if they emphasize one or two points to supplement a teaching sequence. This is borne out by Postlethwait(17), who uses silent single concept loop films to illustrate specific concepts in botany. West and McKim(18), who have utilized 8 mm sound loops, reported that programmed cinematic self-instruction was effective. The educational communication project at Teachers College, Columbia, under the direction of Forsdale(19) has made loop films of several types among which are: a) skill teaching films, b) drill films, c) motivation films, d) films of phenomena, and e) situation films. At the Single Concept Film Conference(20), eight of the ten speakers indicated a great need for exploration into the part that films integrated with other media can play in increasing efficiency and quality of medical education.

The Department of Veterinary Anatomy and the Medical Illustration Section of the School of Veterinary Science and Medicine of Purdue University, with the advice of Dr. Postlethwait, has produced 14 "single concept" 8 mm loop films. These films were utilized as teaching aids during 1965-66 in gross and applied anatomy courses. It was felt that these were well accepted by students and quite effective. The films were used to replace prosected specimens, to correlate structure with function, and to serve as review aids. It appeared that less staff time was spent in going over the same material with individual students, leaving more time to answer specific questions. Since films can be easily reproduced, more could be made available, and it has seemed that students derive more from the films than the previously used prosected material. However, no adequate evaluation data was collected then.

OBJECTIVES

From reviewing the literature and our experience using them it appeared that silent single concept loop films could help alleviate some of the current problems in the field of medical education and serve as a valuable teaching adjunct. Before further expansion of the production of single concept loop films could be justified, data as to their teaching effectiveness, student acceptance, time involvement for staff and student, as well as their economy had to be collected. It was decided to test loop films in the basic anatomy course for their usefulness as primary teaching tools or aids as compared to the more conventional methods, and in the applied anatomy course for their usefulness as review aids. The primary objectives of this study may be briefly stated as follows:

In basic anatomy

1. To evaluate the acceptance and effectiveness of silent loop films as a primary teaching aid.
2. To determine whether loop films can be substituted for prosected guides or student cadaver dissection.
3. To compare the relative costs of loop films to fixed dissection materials.

In applied anatomy

1. To evaluate the acceptance and effectiveness of silent loop films as a review aid for anatomy.
2. To determine if loop films can be substituted for fresh and/or fixed dissection material in anatomical review.
3. To compare the economy of loop films to fresh and/or fixed dissection materials.

METHODS

Basic Anatomy

The basic anatomy course is taught to 60 first year veterinary students who have had little previous exposure to anatomy. In basic anatomy the acceptance and effectiveness of loop films as primary teaching aids and as a substitute for the prosected guide cadaver was tested. Loop films were used in the presentation of five units of the basic anatomy course.

I. Canine female urogenital tract
II. Canine limb innervation - brachial plexus
III. Canine limb innervation - lumbo-sacral plexus
IV. Skeletal preparation
V. Prehension in the domestic species

For each unit the students were divided randomly into three groups of approximately twenty students each. In the case of Units I, II, and III, three methods of presentation were utilized. (See Appendix A for direction sheets and for handouts.)

Group 1. Conventional method (dissection guide, prosected cadaver, and student dissection on a cadaver)
Group 2. Dissection guide, student dissection on a cadaver with loop films substituted for the prosected cadaver
Group 3. Dissection guide with loop films as the primary learning aid (substituted for the prosected cadaver and student dissection on a cadaver)

The groups were rotated among the methods of presentation as they proceeded from one of the three units to the next. Thus at the end of Unit III each student had experienced all three methods of presentation. Students in all groups were tested on recognition of structure and correlation of structure with function immediately following each unit (quiz 1) and one month later (quiz 2). (See Appendix A for the quiz sheets.) During each presentation records of each student's time were kept. An opinion questionaire was filled out following the presentation of Unit III. (See Appendix A for the questionaire.)

With Unit IV, the defleshing of a dog for skeletal preparation, each of the three student groups had a different guide for the activity. (See Appendix A for the direction sheet and the handout.)

Group 1. Loop films
Group 2. Handout
Group 3. Instructor

An accurate record of each student's time spent defleshing the dog was kept and the investigator solicited comments from the students on their guide method following the activity.

All students had access to the loop films in Unit V, prehension in the domestic species. (See Appendix A for the directions and opinion

sheet.) The students were directed to dissect in the normal manner using the loop films for structure-function correlation. The students recorded the number of times they observed each film and answered additional opinion questions.

Applied Anatomy

In applied anatomy, which is taught to third year veterinary students who have had basic anatomy, the acceptance and effectiveness of loop films as a review aid was evaluated. The hypothesis that loop films could be substituted for fixed or fresh dissection materials in review was also tested. The following six units were presented to three groups of approximately twenty randomly selected students.

I. Canine female urogenital tract
II. Canine limb innervation - brachial plexus
III. Canine limb innervation - lumbo-sacral plexus
IV. Surgical approaches - pectoral limb I
V. Surgical approaches - pectoral limb II
VI. Surgical approaches - pelvic limb

For all six units the following three methods of presentation were utilized. (See Appendix B for the direction sheets and the handouts.)

Group 1. Loop films plus handout or text
Group 2. Fixed cadaver plus handout or text
Group 3. Fresh cadaver plus handout or text

The student groups were rotated among the methods of presenation as they proceeded from one of the six units to the next. Thus at the completion of the study each student would have had two units presented using loop films, two using the fixed cadaver and two using the fresh cadaver. The students recorded the amount of time they spent on each of the units and filled out the opinion questionaire following the completion of the sixth unit. A pre-quiz was given prior to each unit's presentation to determine any differences in the quality of groups (see Appendix B for the pre-quizzes) as well as a post-quiz one week following each unit (see Appendix B for the post-quizzes). The quizzes were objective and constructed to emphasize principles, recognition of structure as well as correlation of structure with function.

The loop films were produced in conjunction with the Veterinary Medical Illustration and Visual Aids Section, under the direction of Professor Al Allen (see Appendix C for the listing of loop films). One series was produced in black and white, the rest in color. (See Appendix D for loop film production cost chart.) The series of films on innervation to the canine limbs (brachial plexus and lumbo-sacral plexus) were adapted from "Functional Anatomy of the Nerves to the Appendages" by R.P. Worthman, D.V.M., Washington State University. Three super 8 mm color copies of the 16 mm film were purchased from Calvin Productions, Kansas City, Missouri and cut into 9 loops per copy and loaded into cartridges. (See Appendix C for the length of each film.) For cost comparison, the cost of fixed and fresh dissection materials was made available from departmental records.

RESULTS AND FINDINGS

Basic Anatomy

Quiz 1 and quiz 2 results of each treatment group in Units I, II, and III were analyzed using a one way analysis of variance design. In the case of quiz 1, given immediately following the presentation of each unit, no significant differences between treatment groups were found at the 0.05 level. With quiz 2, given one month later to test retention, significant differences between groups were obtained in two out of three units. Table 1 shows the quiz 2 mean test scores for the three treatment groups (1-traditional, 2-loop films substituted for the prosected cadaver, 3-loop films as the primary teaching aid) in Unit I - canine urogenital tract. Following a one way analysis of variance on the means, treatments

Table 1.

Analysis of Quiz 2 Test Scores, U.G. Tract, First Year

Treatment groups	1	2	3
Mean	12.40	13.85	14.79

F= 4.18* *$p < 0.05$

were found to differ at the 0.05 level. Table 2 illustrates the three treatment groups mean test scores for quiz 2 of Unit III, lumbo-sacral plexus. An F test again showed these means to be different at the 0.05 level.

Table 2.

Analysis of Quiz 2 Test Scores, Lumbo-sacral Plexus, First Year

Treatment groups	1	2	3
Mean	12.80	15.42	15.26

F= 6.19* *$p < 0.05$

Variance analysis of quiz 2 mean test scores in Unit II, brachial plexus, showed no significant differences at the 0.05 level (see Table 3).

Table 3.

Analysis of Quiz 2 Test Scores, Brachial Plexus, First Year

Treatment groups	1	2	3
Mean	13.10	14.70	14.32

F= 1.88* *NS

Although the mean test scores illustrated in Table 3 showed no significant difference, they did indicate a possible trend of higher mean test scores for the treatment groups (2 and 3) which were exposed to loop films. In the case of Units I and II this trend showed up as a significant difference in favor of these two treatment groups (2 and 3).

While there appeared to be no significant difference in the results of the learning procedures immediately following the presentations, the addition of loop films, whether substituted for the prosected cadaver or as the primary learning aid, appeared to benefit retention. An increase in retention is supported by Rimland(11), who found that repetition of a film results in substantial increments in learning over time. Since loop films are short the students can repeat them several times, having the effect of repeating the total lesson and thus presumably aiding retention. The finding of no significant difference between treatment groups immediately following instruction is in agreement with the findings of Stein(5), Vander Meer(6) and Snow(7).

Each student recorded the amount of time he spent in each learning exercise of Units I, II and III. A one way analysis of variance of the mean times indicated no significant differences between the groups.

Unit IV, dog defleshing for skeletal preparation, is a technique oriented exercise. The objective is to remove as much flesh from the dog skeleton in as short a time as possible in preparation for boiling. As is apparent from Table 4, the treatment group with the loop films (1) as a guide performed the task at a faster rate than the groups with a handout (2) or the group having an instructor (3) as a guide. This finding

Table 4.

Analysis of Variance, Time, Dog Defleshing, First Year

Treatment groups	1	2	3
Mean time	2.97	3.76	3.33

F= 10.55* *p < 0.05

is supported by Stein(5), Vander Meer(6) and Harby(9) who found that loop films can teach skills as effectively as instructor demonstrations. The superiority of loop films as a technique guide might be attributed to the ease of access to loop films and their ability to show the whole procedure in a very short time. The group using the handout lacked any visual image of what they were trying to accomplish while the group with the instructor would be hindered by the number of questions other members of the treatment group asked and the resultant lack of individual attention. In the case of the loop films any student could see any part of any film within a very short time.

In Unit V, prehension in the domestic species, the students observed the six loop films on prehension an average of 1.66 times each. A series of opinion questions accompanied the directions for Unit V, which was the last loop film unit. These are summarized in Appendix E, summary sheet 2. An earlier opinion sheet filled out after the completion of Unit III is also summarized in Appendix E, summary sheet 1. In response to the question, "Did the loop films help you in the correlation of structure with function," 95% replied "yes" with 91% of the students rating this as being very valuable or valuable to them. Sixty-eight percent of the students felt that the addition of loop films illustrating function helped to make the structure of organs clearer to them. This is supported by the findings

of Huber(15). Two other questions concerning the usefulness of loop films in the correlations of structure with function (summary sheet 1, #6 and summary sheet 2, #C-3) emphatically supported the above data. On opinion sheet 1, 91% of the students liked loop films as a teaching aid, with 88% feeling they learned as fast and 76% stating they learned as well. The above percentages are interesting in light of Twyford's(21) findings that students can predict with reasonable accuracy whether they are learning or not. Better than three fourths of the students stated that loop films are easier or as easy to understand as the prosected animal. However, when asked how they thought loop films might be best used, 95% of the students rated loop films "fair to poor" as a primary teaching tool. Eighty-seven percent of the students felt that loop films would make a "good to excellent" review aid. In reply to question #7, summary sheet 1, which required an essay response, 48% of the students mentioned the usefulness of loop films as a substitute for the prosected guide.

Applied Anatomy

One way analyzes of variance of the pre-quizzes, which were given prior to each of the six units, showed that there were no significant differences between treatment group means at the 0.05 level; indicating that prior knowledge of the subject matter should not be a factor affecting the outcome of the different methods of presentation. Likewise, an analysis of variance between the test scores of the three treatment groups following the presentations of each of the six units again revealed no significant differences. Thus in the presentation of the material of each of the six units there was no appreciable advantage to any of the three different methods of presentation.

The students were asked to record their time spent in the learning process for each of the units. Variance analysis of treatment group mean time for the six units revealed two (Units II - brachial plexus and III - lumbo-sacral plexus) with significant differences. As is apparent from Tables 5 and 6, the treatment group requiring the most time in both cases was group 1, (loop films plus handout).

Table 5.

Analysis of Variance, Time, Brachial Plexus, Review

Treatment groups	1	2	3
Mean time	15.75	9.47	9.31

F= 20.09* *p < 0.05

Table 6.

Analysis of Variance, Time, Lumbo-sacral Plexus, Review

Treatment groups	1	2	3
Mean time	15.12	8.44	8.13

F= 21.84* *p < 0.05

A list of each of the loop films and its running time appears in Appendix C. For comparison, the total film running time of each unit is as follows: Unit I - urogenital 7'25"; Unit II - brachial plexus 12'35"; Unit III - lumbo-sacral plexus 13'25"; Unit IV - pectoral limb I 6'15"; Unit V - pectoral limb II 6'35"; Unit VI - pelvic limb 6'. As is apparent the running time of the loop films used in the presentation of Units II and III is almost twice that used in the other four Units (I, IV, V, VI). This may account for the increased time taken by treatment group in Units II and III. The students in all units which had loop films as a method of presentation (treatment group 1) averaged between 1.3 and 1.7 viewings of the units' films. Thus if a unit's loop films are long, perhaps the student could review the subject matter faster by some other method. However, if the loop films used in a unit are short, as was the case in four of the units in this study, there seems to be no significant difference in the time spent learning.

A factor not considered in this study was instructor time (approximately 25 minutes per demonstration) spent in the preparation of fresh and fixed prosected cadavers for each unit. Many students in groups II and III mentioned that if they had had to do the dissections themselves their time spent in the unit would have been increased three to four times. This is supported by opinion sheet 3, question #7, to which 72% of the students replied that loop films would be a faster method of review than active dissection. In response to the question, "Do you like loop films as a review aid," 81% answered "yes". When asked to choose which they preferred for review only 42% indicated loop films with 54% of the students choosing prosected fresh specimens and 4% choosing prosected fixed specimens. Eighty-four percent of the students felt that loop films were as easy or easier to understand than the prosected cadaver. It is interesting to note that neither the freshmen nor the juniors considered loop films as a novelty.

The age old complaints against the smell of formalin fixed tissue and the rapid deterioration of fresh tissue were mentioned numerous times in the comment section, with several students stating that they preferred loop films over prosections or dissection for these reasons. Several students mentioned they preferred fresh cadavers because they thought that the natural feel of tissues aided their learning. However, West and Stickley(24) point out that with the knowledge explosion we should strive for maximal learning in minimal time and it is the aim of cinematic self-instruction to increase breadth, even though some depth is sacrificed in the process.

PRODUCTION COSTS

Due to the variability in the types of loop films (super 8 mm vs. 8 mm, black and white vs. color), method of production (direct vs. internegative vs. optical print master), length of loop films (12 ft. - 61 ft.), amount of original film used, amount of art work and titles included, complexity of the subject, number of release prints ordered and man hours required, it is impossible to come up with an average cost per loop. The loop film production chart in Appendix D illustrates eight procedures for producing super 8 mm loop films approximately four minutes long using the

prices that are currently available to us. Upon first examination it appears easiest and cheapest to shoot and edit the original film and to print super 8 mm loop films (see Appendix D, procedure 1). However, the quality of the original film deteriorates with handling and all splices and scratches are reproduced in the final product, lowering the overall quality. If multiple copies are going to be made and a higher quality final product is desired, then the use of an internegative or a print master is preferred (see Appendix D, procedures 2-7). A high quality film is important in teaching. Therefore, for the relatively small additional cost (approximately $10.00 per loop) we prefer to reproduce our films using an internegative or print master. With procedure #4, which we preferred, a black and white work print is edited and a 16 mm copy of the final product is available for class room projection. The chart does not include the man hours spent in the actual planning, setting up, shooting, editing and art work but rather outlines those procedures that were done by a commercial lab. Based on our experience an estimate of five man days total is given for the time involved in the production of a four minutes loop film. The salaries for the necessary man hours added to the price of materials and processing provides a very rough cost figure of $60.00 per super 8 mm loop film if at least six copies of the loop film are ordered.

Where the instructor feels that color is not a factor in the presentation of subject matter, some monies can be saved in production by using black and white film. This method is outlined as procedure #8 on the cost chart, and was used in the production of six of the films for this project.

Dogs, fixed or fresh, for dissection cost between $20-$25 apiece while horses used for dissection range from $30-$100 and cows are from $130 up. In cost comparison it is assumed that fresh specimens will not last beyond two weeks and fixed tissue will not last over two years. If a procedure is only illustrated once per year and one dog is used for the demonstration the loop films will have paid for themselves within three years. This is not considering the increased use that would take place for review and in ansillary areas if the loop films were made available. In the case of the larger animals it may be less expensive to produce a loop films for the initial use. A straight comparison, one dog = one demonstration = one loop films use, is not fair since a cadaver could be used for more than one demonstration as long as it is within the given time limits. However, loop films are very convenient and they may be used numerous times throughout the year, each time avoiding the necessary preparation needed by the prosected cadavers.

CONCLUSIONS AND RECOMMENDATIONS

In the basic anatomy units, no significant differences between treatment groups were apparent immediately following presentation of a subject unit; however, the addition of loop films to a method of presentation appeared to aid retention in this study. A saving of time was apparent for the treatment group having loop films as their guide in a technique oriented exercise. The students felt that loop films were extremely useful in the correlation of structure with function and as review aids. They also felt that loop films were good teaching aids and could serve as a substitute for the prosected cadaver. However, the students expressed doubts about the effectiveness and a strong dislike for loop films as a primary teaching tool (as a substitute for dissection).

In applied anatomy analyses revealed that the different methods of treatment resulted in no significant differences in achievement. Student opinion indicated that super 8 mm loop films were preferred for review over active dissection or viewing the prosected fixed cadavers and could serve as a substitute for the prosected fresh cadaver. As a review aid loop films will save either the instructor's time in preparation or the students' time in dissection.

If loop films are used two to three times per year to replace cadavers they are relatively inexpensive. However, considering the time involved to make a good loop film (five man days of labor and a total of 2-2½ months from start to finish to allow for processing) decisions concerning the most relevant subjects for loop films must be made. As a result of this study, loop films which we produce in the future will be in the areas that correlate structure with function or films which will serve as review aids.

REFERENCES

1. Food and Agriculture Organization of the United Nations. FAO/WHO Expert Panel on Veterinary Education. Report of the Second Meeting, August 12, 1965.
2. Venzke, W.G.: Survey of Anatomists, read before American Association of Veterinary Anatomists, Louisville, Kentucky, July 11, 1966.
3. Joint Committee on Veterinary Education. Manpower in Veterinary Education. American Veterinary Medical Association, Chicago, Ill.
4. Julian, L.M.: The Teaching of Anatomy in the Veterinary Curriculum. Amer. Journal of Veterinary Research. 26:2, March, 1965.
5. Stein, Sara Christine: An experimental study of the use of motion picture film loops in the instruction of beginning typewriting. Unpublished Doctor's Dissertation, University of Southern California, Los Angeles, 1958.
6. Vander Meer, A.W.: Relative Effectiveness of Instruction by Films Exclusively, Films Plus Study Guides, and Standard Lecture Methods. Document No. 269-7-13 in Instructional Film Research Reports. Vol. 11, U.S. Naval Training Device Center, Post Washington, L.I., N.Y.
7. Snow, R.E., J. Tiffin and W. Seibert: Individual Differences and Instructional Film Effects. J. Educ. Psychol. 56:315-26, Dec., 1965.
8. Vander Meer, A.W.: Instructional Effect of the Film "How to Operate the Army 16 mm Sound Projector". Document No. 269-7-29 in Instructional Film Research Reports. Vol. 11, U.S. Naval Training Device Center, Post Washington, L.I., N.Y.
9. Harby, S.F.: Evaluation of the Procedure for Using Daylight Projection of Film Loops in Teaching Skills. Document No. 269-7-25 in Instructional Film Research Reports. Vol. 11, U.S. Naval Training Device Center, Post Washington, L.I., N.Y.
10. Murnin, J.A., W. Hayes and S.F. Harby: Daylight Projection of Film Loops as the Teaching Medium in Perceptual Motor Skill Training. Document No. 269-7-26 in Instructional Film Research Reports. Vol. 11, U.S. Naval Training Device Center, Post Washington, L.I., N.Y.
11. Rimland, B.: Effectiveness of Several Methods of Repetition of Films. Document No. 269-7-45 in Instructional Film Research Reports, Vol. 11, U.S. Naval Training Device Center, Post Washington, L.I., N.Y.
12. Ruhe, D.S.: Short Motion Films for Medical School Classroom Instruction. J. Med. Educ. 28:49-83, 1953.
13. Leveridge, L.L.: Films for Medical Education. J.Med.Educ. 38:307-314, April, 1963.
14. Markee, J.: The Integration of Single Concept Films into the Medical Curriculum. Papers and Proceedings of Single Concept Teaching Film Conference. Communicable Disease Center, Atlanta, Ga. April, 1965.
15. Huber, J.F.: Potential of Programmed Single Concept Film in the Teaching of Anatomy. Papers and Proceedings of Single Concept Teaching Film Conference. Communicable Disease Center, Atlanta, Ga. April, 1965.

16. Ham, T.: Case Teaching Methods. Papers and Proceedings of Single Concept Teaching Film Conference. Communicable Disease Center, Atlanta, Ga. April, 1965.
17. Postlethwait, S.: Personal Communication. Department of Botany and Plant Pathology. Purdue University, Lafayette, Indiana.
18. West, T.C., J.W. McKim and W.T. Stickley: The 8 mm Film as a Dynamic Instructional Media in Bio-medical Education. J. Biol. Photogr. Assoc. 33:161-168, November, 1965.
19. Forsdale, L.: 8 mm Film: A New Tool for Research and Education. Papers and Proceedings of Single Concept Teaching Film Conference. Communicable Disease Center, Atlanta, Ga. April, 1965.
20. Papers and Proceedings of Single Concept Teaching Film Conference. Communicable Disease Center, Atlanta, Ga. April, 1965.
21. Twyford, L.: Film Profiles. Document No. 269-7-23 in Instructional Film Research Reports. Vol. 11, U.S. Naval Training Device Center, Post Washington, L.I., N.Y.
22. Martin, D.S.: A Proposed Infectious Disease Teaching Aid Library; J. Med. Educ. 39:374-376, April, 1964.
23. North, A.F.: Learning Clinical Skills Through the Use of Self-Teaching Films. J. Med. Educ. 42:177. 1967.
24. West, T.C. and W.T. Stickley: Reinforcement Experiment in Laboratory Pharmacology by Film: A Model for Cinematic Self-Instruction in Medical Education. J. Med. Educ. 40:990. 1965.

APPENDIX A

Direction, Handout, Quiz and Opinion Sheets Used in Basic Anatomy

Loop Film Trial

First Year

Female Uro-Genital System
Unit I
Directions

Depending on your group assignment study the female urogenital system of the dog utilizing the handout, Miller pp. 200-205 and the media assigned.

Group 1. Dissect in the regular manner making full use of the dissection guide, prosected animal and handout.

Group 2. Use the loop films as you would normally use the prosected animal. Read the book or handout and do your dissection on the cadaver.

Group 3. Use the loop films in place of active dissection on a cadaver. While you read the book or handout observe the loop films.

Loop Film Trial

First Year

Female Uro-Genital System
Unit I
Primary Learning Aid

Utilizing the media provided identify the right and left kidneys (noting their position in the body) ureter, bladder and urethra. These structures make up the urinary portion of the urogenital system.

The components of the genital portion are right and left ovaries, oviducts, uterine horns, uterus body, cervix and vagina. Note the ovarian bursas which are the uteri openings into the peritoneal cavity. The fimbrae surrounding these openings guide the released egg into the oviducts.

The uterus and ovaries are suspended on the abdominal cavity by ligaments. The suspensory ligaments run from the ovaries to a strong attachment in the transversalis fossia medial to the 13th rib. The proper ligament continues the suspensory ligament and connects the ovary and the uterus. The braod ligament is a double peritoneal fold attaching the ovaries and the uterus to the lateral body wall. Its chief function is to carry the vessels and nerves. In the free border of this peritoneal fold is the round ligament which is a feeble fibromuscular cord. It arises near the ovary and runs down to and through the vaginal ring.

Blood is supplied to the uterus via the uterine and ovarian arteries which anastomose in the broad ligament near the ovary. The right and left ovarian arteries are direct branches of the aorta. The right and left uterine arteries are brahches of the urogenital arteries which in turn are branches of the right and left internal iliacs which come off of the aorta.

Venous drainage is via correspondingly named veins. The right and left uterine veins drain into urogenital veins to internal iliac veins to the post cava. The left ovarian vein drains into the left renal and then into the post cava.

Loop Film Trial

First Year

Female Uro-Genital System
Unit I
Quiz I

1. List the blood supply to the uterus.

2. List the venous drainage of the ovary.

3. The ligaments associated with the bitch's reproductive tract are:

4. Identify the tagged structures:

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

Loop Film Trial

First Year

Female Uro-Genital System
Unit I
Quiz II

1. The _____ ligament attaches the ovary to the uterus.

2. The _____ ovarian vein empties into the renal vein whereas the _____ ovarian vein dumps into the post cava.

3. The suspensory ligament attaches the _____ to the _____.

4. The _____ and _____ arteries anastomose near the ovary.

5. Identify:

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

Loop Film Trial

First Year

Brachial Plexus
Unit II
Directions

Group 1. Dissect the nerves of the brachial plexus in the regular manner making full use of Miller's dissection guide pp. 167-169 and the prosected animal. Attempt to evaluate the effects of a lesion of the nerves on function.

Group 2. Dissect the nerves of the brachial plexus in the regular manner making full use of Miller's dissection guide pp. 167-169. Use the loop films as you would use the prosected animal. Attempt to evaluate the effect of a lesion of the nerves on function.

Group 3. Use the loop films in place of active dissection on a cadaver. Read Miller's dissection guide pp. 167-169 and observe the loop films for the paths of the nerves. Attempt to evaluate the effect of a lesion of the nerves on function.

Loop Film Trial

First Year

Brachial Plexus
Unit II
Quiz I

1. What spinal nerves make up the brachial plexus?

2. The _____ nerve serves the extensors of the digits.

3. The median and _____ arise by a common trunk and supply _____ (extensors, flexors) of the carpus and thus the _____ (cranial, caudal) side of the forearm.

4. The musculocutaneous nerve serves what area?

5. The _____ nerve supplies the supraspinatus muscle.

6. Identify:

   a. _____

   b. _____

   c. _____

   d. _____

7. On the following accompanying diagram draw in the distribution of the radial nerve.

Loop Film Trial

First Year

Brachial Plexus
Unit II
Quiz II

1. What spinal nerves make up the brachial plexus?

2. Atrophy of the supra and infra spinatus might be caused by a lesion to _____ nerve.

3. The radial nerve serves what area?

4. The caudal side of the forearm is served by what nerves _____, _____.

5. Identify:

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

6. On the accompanying diagram draw in the distribution of the median nerve.

Loop Film Trial

First Year

Lumbo-Sacral Plexus
Unit III
Directions

Group 1. Dissect in the regular manner making full use of the dissection guide and the prosected animal. Attempt to evaluate the effect of a lesion of the nerves on function.

Group 2. Dissect in the regular manner using the loop films as you would use the prosected animal. Attempt to evaluate the effect of a lesion of the nerves on function.

Group 3. Use the loop films in place of active dissection on a cadaver. Read the dissection guide and observe the loop films for the paths of the nerves. Attempt to evaluate the effect of a lesion of the nerves on function.

Loop Film Trial

First Year

Lumbo-sacral Plexus
Unit III
Quiz I

1. What spinal nerves make up the lumbo-sacral plexus?

2. The obturator serves _____ groups of muscles.

3. Injury to the obturator nerve results in:

4. The femoral nerve serves _____ group of muscles.

5. The saphenous branch of the femoral nerve serves what cutaneous area?

6. What area(s) and group(s) of muscles are supplied by the fibular nerve?

7. What area(s) and group(s) of muscles are supplied by the tibial nerve?

8. Describe the effects of a lesion to the sciatic nerve.

9. A dog with a lesion of the femoral nerve would be unable to _____ (extend or flex) the stifle.

10. On the accompanying diagram draw the distribution of the femoral nerve.

Loop Film Trial

First Year

Lumbo-Sacral Plexus
Unit III
Quiz II

1. Identify the tagged nerve _____. What is its function?

2. Identify the tagged nerve _____. What is its function?

3. Describe the effect of a lesion of the obturator nerve.

4. Describe the effect of a lesion of the tibial nerve.

5. What nerve serves the quadriceps femoris?

6. Identify the tagged nerve _____.

7. Loss of sensation to the medial side of the stifle is most likely caused by _____ nerve.

8. Inability to fix the stifle is associated with _____ nerve.

9. Identify the tagged nerve.

10. Identify the tagged nerve.

Loop Film Trial

First Year

Defleshing
Unit IV
Directions

The objective of this exercise is to remove as much of the flesh and visceral structures from the bony structure of the dog as possible in order to prepare a skeleton. Depending on your group assignment use the media assigned as your guide. Keep an accurate record of the time spent defleshing.

Group 1. Loop Films. Observe the loop films before and during the defleshing procedure.

Group 2. Handout. Follow the step wise procedure listed in the handout for defleshing.

Group 3. Instructor. The instructor will instruct you as to the procedure for defleshing.

Loop Film Trial

First Year

Skeletal Preparation
Unit IV
Directions

1. Obtain a fresh exsanguinated dog.

2. Remove the viscera.

3. Place the dog on its side and start on the front limb.
   a. Make parallel incisions on either side of the spine of the scapula removing the musculature from the lateral surface of the scapula. (Do not detach the scapula).
   b. Follow down the leg removing the flesh over the scapulo-humoral joint.
   c. Cut around the leg just below this joint and strip the leg (muscles and skin together) down and off the phalanges.
      1. Use care to remove the skin and musculature in and around the joints and phalanges.
   d. After cleaning the front limb remove it from the body with a medial parallel incision to the body of the scapula.

4. Repeat the same procedure on the opposite front limb.

5. Roll the dog up on its back making a cut in the groin region from the anus to the flank.
   a. Clean the musculature around the hip joint and half the pelvis. (Do not detach the hind limb).
   b. Continue down the hind limb stripping it of skin and muscle in a manner similar to the front leg.
   c. After cleaning the limb remove it by cutting the joint capsule and round ligament.

6. Repeat the same procedure on the opposite hind limb.

7. Cut around the base of the tail and make a longitudinal incision along the coccygeal vertebrae. Strip the skin and what musculature you can from the tail.

8. Split the skin down the backbone to the head.
   a. Starting at the tail region make a parallel incision to the dorsal spines of the vertebrae loosing and removing the musculature from one side of the vertebral column.
   b. Continue to roll the skin and muscle towards the head removing it over the ribs as well.

9. Repeat the procedure on the opposite side.

10. Hang the dog up by its pelvis.

11. Cut and roll the musculature and skin from around the cervical vertebrae up to the head.

12. Split the skin to the tip of the nose.

13. Cut and pull the skin and musculature from the head down off the nose.

14. Clean the musculature from between the thoracic spines of the vertebrae.

15. Clean the musculature from the intercostal space by cutting down the posterior surface of one rib and anterior surface of the corresponding rib.

16. Remove any excess musculature that may still be clinging to the bones.

17. Wrap each leg separately in cheese cloth.

18. Put the body and legs in a bag.

Loop Film Trial

First Year

Prehension and Opinion Sheet
Unit V
Directions

Dissect the oral cavity and related structures in the regular manner following Miller's dissection guide. Upon completion of dissection observe the loop films on prehension in the domestic species and make correlations of structure with function.

1. Record the number of times you viewed each film. cat _____
   pig _____ dog _____ horse grass _____
   cow grass _____ horse and cow grain _____

2. Answer the following opinion questions.
   a. Did the loop films help you in the correlation of structure with function? Yes _____ No _____

      How valuable were they to you in correlations?

Very valuable	Valuable	Not essential	No value
_____	_____	_____	_____

   b. Did the loop films help make the structure of organs clearer?
      Yes _____ No _____

      How valuable were they in this respect?

Very valuable	Valuable	Not essential	No value
_____	_____	_____	_____

   c. Do you think loop films might be best used:
      1. as the primary teaching tool

Excellent	Good	Fair	Poor
_____	____	____	____

      2. as a primary teaching aid

Excellent	Good	Fair	Poor
_____	____	____	____

      3. in correlations of structure with function

Excellent	Good	Fair	Poor
_____	____	____	____

      4. as the primary review tool

Excellent	Good	Fair	Poor
_____	____	____	____

      5. as a primary review aid

Excellent	Good	Fair	Poor
_____	____	____	____

Loop Film Trial

First Year

Opinion Questions

1. Did you like loop films as a teaching aid?

2. Were the loop films as easy, easier or harder to understand than the prosected animal?

3. Did you learn as fast?

4. Did you learn as well?

5. How would you compare the loop films to active dissection (effectiveness and speed of learning)?

6. Did loop films help you in the correlation of structure and function? How much?

7. How do you think loop films might be best used?

8. Do you consider loop films as a novelty?

APPENDIX B

Direction, Handout, Quiz and Opinion Sheets Used in Applied Anatomy

Loop Film Trial

Review

Uro-Genital System
Unit I
Directions

Depending on your group assignment review the urogenital system of the dog utilizing the handout and the media assigned.

Group 1. Loop Films. Observe the loop films thinking of the function of each named structure and noting its location in relationship to other structures. Keep track of the number of times you observe each film.

Group 2. Fixed Cadaver. Following the handout observe the structures named; think of the functions of each and note their location in the animal. Keep track of your total time reading the handout and observing the cadaver.

Group 3. Fresh Cadaver. Following the handout observe the structures named; think of the function of each and note their location in the animal. Keep track of your total time reading the handout and observing the cadaver.

Loop Film Trial

Review

Uro-Genital System
Unit I
Review Handout

Utilizing the media provided identify the right and left kidneys (noting their position in the body) ureter, bladder and urethra. These structures make up the urinary portion of the urogenital system.

The components of the genital portion are right and left ovaries, oviducts, uterine horns, uterus body, cervix and vagina. Note the ovarian bursas which are the uteri openings into the peritoneal cavity. The fimbrae surrounding these openings guide the released egg into the oviducts.

The uterus and ovaries are suspended on the abdominal cavity by ligaments. The suspensory ligaments run from the ovaries to a strong attachment in the transversalis fossia medial to the 13th rib. The proper ligament continues the suspensory ligament and connects the ovary and uterus. The broad ligament is a double peritoneal fold attaching the ovaries and the uterus to the lateral body wall. Its chief function is to carry the vessels and nerves. In the free border of this peritoneal fold is the round ligament which is a feeble fibromuscular cord. It arises near the ovary and runs down to and through the vaginal ring.

Blood is supplied to the uterus via the uterine and ovarian arteries which anastomose in the broad ligament near the ovary. The right and left ovarian arteries are direct branches of the aorta. The right and left uterine arteries are branches of the urogenital arteries which in turn are branches of the right and left internal iliacs which come off the aorta.

Venous drainage is via correspondingly named veins. The right and left uterine veins drain into urogenital veins to internal iliac veins to the post cava. The left ovarian vein drains into the left renal and then into the post cava.

Loop Film Trial

Review

Uro-Genital System
Unit I
Pre-Quiz

1. Give the blood supply to the uterus.

2. Give the blood drainage of the ovary.

3. Name the ligaments associated with the bitch's reproductive tract.

4. Identify:
   a.
   b.
   c.
   d.
   e.

Loop Film Trial

Review

Uro-Genital System
Unit I
Post-Quiz

1. Identify:

   a.

   b.

   c.

   d.

   e.

2. The _____ ligament attaches from the ovary to the uterus.

3. The _____ ovarian vein empties into the renal vein whereas the _____ ovarian vein dumps into the post cava.

4. The suspensory ligament attaches the ovary to _____.

5. The _____ and _____ arteries anastomose near the ovary.

Loop Film Trial

Review

Brachial Plexus
Unit II
Directions

Depending on your assignment review the nerves of the brachial plexus utilizing the handout and media assigned.

Group 1. Loop Films. Using the loop films as your review aid note the location, course, area as well as structures supplied and the function of the nerves illustrated. Keep track of the number of times you observe each film and time spent reading the handout.

Group 2. Fixed Cadaver. Using the handout locate each of the named nerves. Note the nerves' course, area as well as structures supplied and effect of a lesion. Keep track of your total time spent reading the handout and observing the cadaver. (Be accurate!)

Group 3. Fresh Cadaver. Using the handout locate each of the named nerves. Note the nerves' course, area as well as structures supplied and effect of a lesion. Keep track of your total time spent reading the handout and observing the fresh specimen. (Be accurate!)

Loop Film Trial

Review

Brachial Plexus
Unit II
Review Handout

The Major Nerves of the Forelimb

The nerves of the forelimb arise from the brachial plexus. The brachial plexus is formed by the ventral branches of the last 3 Cervical and the first 2 Thoracic nerves (C6-7-8, T1-2).

SUPRASCAPULAR NERVE - 6th (7) Cervical components.

Motor - to supraspinatus and infraspinatus muscles.

Signs of Paralysis - The loss of extensor action by these muscles on the shoulder is difficult to detect. These muscles serve largely as lateral ligaments for this joint. Atrophy is pronounced and the spine of the scapula becomes prominent (Sweeny).

AXILLARY NERVE - (6) 7th (8) Cervical components.

Motor - to certain flexors of the shoulder (teres major, teres minor, deltoideus, part of the subscapularis muscle).

Sensory - from the skin of the dorsolateral aspect of the true arm or brachium.

Signs of Paralysis - Small area of cutaneous desensitization on the lateral side of the arm, but there is no pronounced loss of flexion of the shoulder joint. (Flexion of the shoulder apparently can be accomplished by the synergistic action of such muscles as the long head of the triceps and the latissimus dorsi.)

Test - Flexor Reflex (shoulder) weakened in axillary paralysis.

RADIAL NERVE - 7th 8th Cervical, 1st 2nd Thoracic components.
The entire radial nerve may be injured by fractures of the first rib or traumatic avulsion of its roots from the spinal cord.

Motor - to all the extensor muscles of the elbow, the carpus, and the digits.

Sensory - from the skin on the dorsal and lateral parts of the forearm and the dorsal aspect of the paw.

Signs of Paralysis - The leg can bear no weight when the entire radial nerve is injured. This is primarily due to the paralysis of the extensors of the elbow. This joint remains flexed when walking. When the nerve is injured distal to the branches which supply the triceps muscle, the paralysis is much less marked. Fractures of the humerus may

easily involve this part of the radial nerve. The elbow can be extended, but there is a tendency to knuckle over onto the dorsal side of the paw when walking. After a time, the paralysis may be difficult to detect, but the cutaneous desensitization is diagnostic.

Test - Extensor Thrust Reflex, Supporting and Placing Reactions are absent in radial paralysis.

MUSCULOCUTANEOUS NERVE - 7th Cervical component.

Motor - to special flexors of the elbow joint (biceps and brachialis muscles).

Sensory - from the skin on the medial side of the forearm. An anastomotic branch joins the median nerve and is distributed with it.

Signs of Paralysis - Paralysis of this nerve causes little change in gait. There appears to be a slight straightening of the angle of the elbow joint. With some difficulty, the elbow can still be flexed (as when raising the paw to the edge of the table). This ability is probably due to the flexor action on the elbow joint by the extensor muscles of the carpus and digits which originates on the humerus. Skin is desensitized on the medial side of the forearm.

Test - Flexor Reflex (elbow) weakened in musculocutaneous paralysis.

MEDIAN AND ULNAR NERVES - 8th Cervical, 1st 2nd Thoracic components.

Motor - to all the flexor muscles of the carpus and digits.

Sensory - (together with the anastomotic branch of the musculocutaneous nerve) from the skin and pads on the volar side of the paw. Sensation from the skin on the caudal side of the forearm and the dorso-lateral aspect of the 5th digit is mediated solely by the ulnar nerve.

Signs of Paralysis - Loss of both these nerves causes little alteration of gait. There is some sinking of the carpus and fetlock due to the loss of tone to the flexors of these joints. Injury to the ulnar nerve does cause desensitization in the areas which are supplied solely by it. The volar aspect of the paw is completely desensitized only when 3 nerves, the median, the ulnar, and the musculocutaneous are injured. Active flexion of the carpus is lost.

Reference: Demonstration of Specific Nerve Paralyses in the Dog, by R.P. Worthman; J.A.V.M.A. 131: 174-178 (1957).

Loop Film Trial

Review

Brachial Plexus
Unit II
Pre-Quiz

1. What spinal nerves make up the brachial plexus?

2. The suprascapular supplies what two muscles?

3. The extensors of the elbow carpus and digits are supplied by the _____ nerve.

4. The median and _____ nerves arise by a common trunk and they supply the _____(extensors, flexors) of the carpus and thus the _____ (cranial, caudal) side of the forearm.

5. Identify:

   a.

   b.

   c.

   d.

Loop Film Trial

Review

Brachial Plexus
Unit II
Post Quiz

1. What spinal nerves make up the brachial plexus?

2. Paralysis of the suprascapular nerve results in atrophy of what two muscles?

3. Lack of a placing reflex in one of the pectoral limbs indicates the _____ nerve is injured.

4. The musculocutaneous nerve is motor to what muscles?

5. The _____ and _____ nerves are motor to the flexor muscles of the carpus and digits.

6. Identify:

   a.

   b.

   c.

   d.

Loop Film Trial

Review

Lumbo-sacral Plexus
Unit III
Directions

Depending on your group assignment review the nerves of the lumbo-sacral plexus utilizing the handout and the media assigned.

Group 1. Loop Films. Using the loop films as your review aid note the location, structures, and area supplied as well as the function of the nerves illustrated. Keep track of the number of times you observe each film.

Group 2. Fixed Cadaver. Using the handout locate each of the named nerves. Note the nerves' location, structures, and area supplied as well as the effect a lesion would have. Keep track of your total time spent reading the handout and observing the cadaver.

Group 3. Fresh Cadaver. Using the handout locate each of the named nerves. Note the nerves' location, structures, and area supplied as well as the effect a lesion would have. Keep track of your total time spent reading the handout and observing the fresh specimen.

Loop Film Trial

Review

Lumbo-sacral Plexus

Unit III
Review Handout

1. Femoral N. - Supplies quadriceps femoris M. (Extensor of stifle). This muscle is essential to the supporting functions of the whole limb. (If the stifle is not fixed, the hock and hip also collapse and the limb can bear no weight = femoral nerve paralysis, azoturia, patellar luxation.) Its saphenous branch is sensory to the medial side of the leg and motor to the sartorius M.

2. Obturator N. - Supplies adductors of the thigh. Vulnerable course in pelvic cavity of shaft of ilium (obturator paralysis - give symptoms).

3. Sciatic N. - Sensory and motor to rest of limb. It courses medial to the trochanteric fossa. (Femoral pinning, hip luxations, etc.) Injury to it would affect both of the following nerves as well as the motor supply to the caudal muscles of the thigh.

   a. Tibial N. - one of two terminal divisions of sciatic N. It supplies the muscles located on the caudal aspects of the true leg (extensors of the hock and flexors of the digits) as well as sensation to plantar side of pes. (Liable to "injury" by procaine penicillin, etc. injections into caudal thigh muscles.)

   b. Common Peroneal (Fibular) N. - the other terminal division of sciatic N. It supplies the muscles located on the anteriolateral aspect of the true leg (flexors of the hock and extensors of the digits) as well as sensation to the dorsal side of the pes. (Because of its superficial course on the lateral side of the stifle joint, it may be vulnerable to injury by pressure - "downer" cows knuckle over at the fetlock when they are forced to stand. It is also liable to injury by injections into the caudal thigh muscles.) The nerve may be blocked at the stifle, but this would include its motor branches.

Loop Film Trial

Review

Lumbo-sacral Plexus
Unit III
Pre-Quiz

1. What spinal nerves make up the lumbo-sacral plexus?

2. The femoral nerve serves _____ muscle a lesion which would result in the animal being unable to _____ the stifle.

3. Name two branches of the sciatic.

4. A lesion of the sciatic nerve would have what effect?

5. Identify:
   a.
   b.
   c.

Loop Film Trial

Review

Lumbo-sacral Plexus
Unit III
Post Quiz

1. What spinal nerves make up the lumbo-sacral plexus?

2. Injury to the _____ results in inability to fix the stifle.

   It is the main motor supply to _____ muscle(s).

   Its branch is the _____ nerve.

3. A synonym for the fibular nerve is _____ nerve.

   It is one of the two terminal branches of the _____ nerve.

   The fibular nerve supplies muscles on the _____ aspect of the true leg which are _____.

4. A lesion of the tibial nerve would have what effect?

5. From the slides identify:

   a.

   b.

   c.

6. On the tagged specimens identify the nerve serving the tagged muscles or area.

   a.

   b.

   c.

Loop Film Trial

Review

Surgical Approaches - Pectoral Limb I
Unit IV
Directions

Depending on your group assignment review the listed surgical approaches to the pectoral limb utilizing the media assigned. Keep track of your total time spent and answer the opinion questions.

Surgical Approaches	Ref. Piermattei & Greeley
1. Humerus - medial approach	pp. 46
2. Humerus - lateral approach	pp. 42
3. Radius - medial approach	pp. 64

Group 1. Loop Films. Using the loop films and the pages listed in the test study the structures involved in the listed surgical approaches.
Time spent _____

Group 2. Fixed Cadaver. Using the fixed cadaver and the pages listed in the text study the structures involved in the listed surgical approaches.
Time spent _____

Group 3. Fresh Cadaver. Using the fresh cadaver and the pages listed in the text study the structures involved in the listed surgical approaches.
Time spent _____

Loop Film Trial

Review

Surgical Approaches - Pectoral Limb I
Unit IV
Pre-Quiz

1. Identify the tagged structures.
   a. _____
   b. _____
   c. _____
   d. _____

2. The _____ nerve is found on the medial side of the olecranon.

3. The _____ muscle runs from the humerus to the head.

4. The large group of muscles located caudal to the humerus are the _____.

Loop Film Trial

Review

Surgical Approaches - Pectoral Limb I
Unit IV
Post Quiz

1. Identify the tagged structures.

   a. _____

   b. _____

   c. _____

   d. _____

2. The _____ process of the ulna is removed in one approach to the elbow.

3. In approaching the humerus from the lateral side you make an incision along the caudal border of _____ muscle.

4. Name one of the two muscles separated in a medial approach to the distal humerus.

Loop Film Trial

Review

Surgical Approaches - Pectoral Limb II
Unit V
Directions

Depending on your group assignment review the listed surgical approaches to the pectoral limb utilizing the media assigned. Keep track of your total time spent and answer the opinion questions.

Surgical Approaches	Ref. Piermattei & Greeley
4. Radius - lateral approach	pp. 66
5. Elbow joint - trans-olecranon approach	pp. 54
6. Ulna - caudal approach	pp. 58

Group 1. Loop Films. Using the loop films and the pages listed in the text study the structures involved in the listed surgical approaches.
Time spent _____

Group 2. Fixed Cadaver. Using the fixed cadaver and the pages listed in the text study the structures involved in the listed surgical approaches.
Time spent _____

Group 3. Fresh Cadaver. Using the fresh cadaver and the pages listed in the text study the structures involved in the listed surgical approaches.
Time spent _____

Loop Film Trial

Review

Surgical Approaches - Pectoral Limb II
Unit V
Pre-Quiz

1. Identify the tagged structures.
   a. _____
   b. _____
   c. _____
   d. _____

2. The _____ muscle lies on the anterior surface of the radius.

3. The (supinator or pronator) is located on the lateral side of the forearm?

4. The (extensor or flexor) carpi ulnaris lies on the medial side of the ulna?

Loop Film Trial

Review

Surgical Approaches - Pectoral Limb II
Unit V
Post Quiz

1. Identify the tagged structures.

   a. _____

   b. _____

   c. _____

   d. _____

2. The _____ vein obliquely crosses the distal end of the medial side of the forearm.

3. To expose the lateral side of the radius you must separate what two muscles?

Loop Film Trial

Review

Surgical Approaches - Pelvic Limb
Unit VI
Directions

Depending on your group assignment review the listed surgical approaches to the pelvic limb utilizing the media assigned. Keep track of your total time spent and answer the opinion questions.

Surgical Approaches	Ref. Piermattei & Greeley
7. Femur - lateral approach	pp. 104
8. Tibia - medial approach	pp. 106
9. Stifle joint - lateral approach	pp. 116

Group 1. Loop Films. Using the loop films and the pages listed in the text study the structures involved in the listed surgical approaches.
Time spent _____

Group 2. Fixed Cadaver. Using the fixed cadaver and the pages listed in the text study the structures involved in the listed surgical approaches.
Time spent _____

Group 3. Fresh Cadaver. Using the fresh cadaver and the pages listed in the text study the structures involved in the listed surgical approaches.
Time spent _____

Loop Film Trial

Review

Surgical Approaches - Pelvic Limb
Unit VI
Pre-Quiz

1. Identify the tagged structures.
   a. _____
   b. _____
   c. _____
   d. _____

2. _____ muscle covers the lateral surface of the pelvic limb. (outlined on the cadaver)

3. True or False - Fascia lata and the stifle joint capsule are the same structure.

4. A (flexor, extensor) of the hock lies on the posterior surface of the tibia.

Loop Film Trial

Review

Surgical Approaches - Pelvic Limb
Unit VI
Post Quiz

1. Identify the tagged structures.

   a. _____

   b. _____

   c. _____

   d. _____

2. To expose the femur you must separate what two major muscles?

3. _____ _____ lies over the stifle joint capsule.

4. The _____ muscle lies along the anterior surface of the tibia.

Loop Film Trial

Review

Opinion Questions

Throughout this past semester you have all been assigned to the test group which utilized loop films as a review aid in applied anatomy. Please answer the following questions to the best of your ability!

1. Did you like the loop films as a review aid?

2. In which capacity would loop films work the best?
   a. as a primary teaching tool
   b. as a review aid
   c. as a primary teaching aid

3. Which did you like the best for review?
   a. prosected fixed specimen
   b. prosected fresh specimen
   c. loop film

   Why?

4. Were the loop films as easy, easier, or harder to understand than the prosected animal?

5. Did you feel you learned as fast or faster from the loop films?

6. Did you feel you learned as well from the loop films?

7. How would you compare the loop films to active dissection (effectiveness and speed of learning)?

8. Did loop films help you to correlate structure with function?

9. Do you consider loop films a novelty?

10. Comments!!

APPENDIX C

Listing of Loop Films

Listing of Loop Films

Super 8 mm Color Loop Films -- Produced on this Grant

Surgical Approaches - Pelvic Limb			Length of Film
1. Surgical Anatomy	Femur	Lateral Approach	1'50"
2. Surgical Anatomy	Tibia	Medial Approach	1'35"
3. Surgical Anatomy	Distal Femur and Stifle Joint	Lateral Approach	2'35"

Surgical Approaches - Pectoral Limb			
1. Surgical Anatomy	Humerus	Medial Approach	2' 5"
2. Surgical Anatomy	Humerus	Lateral Approach	1'35"
3. Surgical Anatomy	Radius	Lateral Approach	2'35"
4. Surgical Anatomy	Radius	Medial Approach	2' 5"
5. Surgical Anatomy	Elbow Joint	Transolecranon Approach	3' 5"
6. Surgical Anatomy	Ulna	Caudal Approach	1'25"

The following films were adapted from "Functional Anatomy of the Nerves to the Appendages" by R.P. Worthman, D.V.M., Washington State University. Super 8 mm color copies were purchased from Calvin Productions, Kansas City, Missouri.

Nerves of the Brachial Plexus	
1. Ulnar and Median Nerve	4' 5"
2. Suprascapular Nerve	2'10"
3. Radial Nerve	3'55"
4. Musculocutaneous Nerve	2'25"

Nerves of the Lumbo-Sacral Plexus	
1. Sciatic Nerve	3'48"
2. Femoral Nerve	2'57"
3. Fibular Nerve	2'32"
4. Tibial Nerve	2' 8"
5. Obturator Nerve	2'

Super 8 mm Black and White Loop Films -- Produced on this Grant

Skeletal Preparation			
1. Skeletal Preparation	Defleshing	Part 1	2'30"
2. Skeletal Preparation	Defleshing	Part 2	3'30"
3. Skeletal Preparation	Defleshing	Part 3	1'50"
4. Skeletal Preparation	Defleshing	Part 4	4'15"

Locomotion in the Domestic Animals	
1. Dog Walking	1'51"
2. Dog Running	2'10"

Listing of Loop Films

Super 8 mm Color Loop Films Produced Previously and Used in This Study

Canine Female Urogenital Tract	Length of Film
1. Topographical Anatomy and Approach	2'15"
2. Genital Tract	1'30"
3. Arteries and Venous Supply	2'45"
4. Ligaments	1'15"
5. Associated Structures	1'40"
Prehension in the Domestic Animals	
1. Horse and Cow Eating Grain	1'20"
2. Cow Eating Grass	1'13"
3. Horse Eating Grass	0'38"
4. Pig Eating Grain	1'42"
5. Cat Eating Meat and Cat Food	1'25"
6. Dog Eating Meat and Dog Food	1'43"

APPENDIX D

Loop Film Production Cost

LOOP FILM PRODUCTION COSTS

MEDICAL ILLUSTRATION
April 5, 1968

Procedures ———	Direct 1	Internegative 2	3	4	Contact Print Master 5	6	7	B&W 8
1. Shoot ECO Original 2:1 -- 200 ft. @ .0659/ft.	13.18	13.18	13.18	13.18	13.18	13.18	13.18	
1a. Black & White Plus x Reversal 200 ft. @ 0414/ft.								8.28
2. Process Original ECO -- 200 ft. @ .045/ft.	9.00	9.00	9.00	9.00	9.00	9.00	9.00	
2a. Black & White Processing 200 ft. @ .035/ft.								7.00
3. Color Reversal Work Print one light -- 200 ft. @ .097/ft.		19.40	19.40		19.40	19.40		
(3) B & W Reversal Work Print one light -- 200 ft. @ .06/ft.				12.00			12.00	12.00
4. 16 mm High Contrast Positive Black and White for Titles Stock and Processing .048/ft. (50' min)		2.39	2.39	2.39	2.39	2.39	2.39	2.39
5. Conform Original film to W.P. - A & B roll, 100 ft. total $10.00/hour - 3 hrs. for 100'		30.00	30.00	30.00	30.00	30.00	30.00	30.00
6. Make 16 mm Interneg. -- 100 ft. @ .35/ft.		35.00	35.00	35.00				
(6) Make 16 mm Contact Printmaster -- 100 ft. @ .16/ft.					28.00	28.00	28.00	24.00
6a. 16 mm B & W Contact Printmaster -- 100 ft. @ .12/ft.								
7. Super 8 Answer Print from Interneg. - 61 ft. @ .096/ft.		5.86	5.86	5.86				
7. 16 mm Answer Print from Interneg. - 110 ft. @ .106/ft.			11.66	11.66				
8. Super 8 Answer Print from Cont. Print Super 8 -- 61 ft. @ .144/ft.					8.78	8.78	8.78	8.78*
(8) 16 mm Answer Print from Cont. Print -- 110 ft. @ .158/ft.	17.38					17.38	17.38	
9. Super 8 Release Print from Interneg. -- 5 x 61 = 366 ft. @ .076/ft.		27.82	27.82	27.82				
(9) Super 8 Release Print from Contact Print -- 5 x 61 = 366 ft. @ .121/ft.	44.28				44.28	44.28	44.28	44.28
10. Super 8 Cartridge & Loading -- 6 @ 1.50 each	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
TOTAL	92.84	151.65	163.31	155.91	164.03	181.41	174.01	121.97

Chart illustrates production of 6 - super 8 mm copies of 61' in length approximately 4 minutes. Procedure 1 - edit original film - all splices and scratches show in end product. Procedures 4 & 7 - work with black and white workprint. Procedures 3,4,6,7 have a 16 mm copy for class room projection.

* Only color stock available for super 8 mm prints

APPENDIX E

Opinion Data Summary Sheets

Loop Film Trial

First Year

Opinion Data Summary Sheet 1

Total of 58 students replying. Replies given in percentages.

1. Did you like the loop films as a teaching aid?
   Yes 91%
   No 7%

2. Were the loop films as easy, easier or harder to understand than the prosected animal?
   As easy 22% Easier 57% Harder 21%

3. Did you learn as fast?
   Yes 88%
   No 12%

4. Did you learn as well?
   Yes 76%
   No 22%

5. How would you compare the loop films to active dissection (effectiveness and speed of learning)?

Effectiveness		Speed of Learning	
loop films more effective	47%	loop films faster	66%
loop films less effective	26%	loop films slower	7%
loop films same as dissection	31%	loop films same as dissection	28%

6. Did loop films help you in the correlation of structure and function?

		How much?	
Yes	78%	Very much	59%
No	2%	Much	26%

7. How do you think loop films might best be used?
   48% with dissections and a book
   59% as a correlation of structure and function
   23% as a review aid

8. Do you consider loop films a novelty?
   Yes 31%
   No 69% *

* 33% mentioned they thought they were a good teaching aid.

Loop Film Trial

First Year

Opinion Data Summary Sheet 2

1. Average number of times each film was viewed.
   cat 1.3 pig 1.4 dog 1.76 cow grass 2.1
   horse grass 1.63 horse and cow grain 1.8
   total number of times loop films viewed - averaged 1.66

2. Total student replies given in percentages.
   a. Did the loop films help you in the correlation of structure with function? Yes 95% No 5%

      How valuable were they to you in correlations?

Very valuable	Valuable	Not essential	No value
53%	38%	7%	2%

   b. Did the loop films help make the structure of organs clearer?
      Yes 68% No 32%

      How valuable were they in this respect?

Very valuable	Valuable	Not essential	No value
28%	40%	21%	12%

   c. Do you think loop films might be best used:
      1. as the primary teaching tool

Excellent	Good	Fair	Poor
0%	5%	24%	71%

      2. as a primary teaching aid

Excellent	Good	Fair	Poor
3%	41%	41%	14%

      3. in correlation of structure with function

Excellent	Good	Fair	Poor
59%	38%	3%	0%

      4. as the primary review tool

Excellent	Good	Fair	Poor
34%	41%	21%	3%

      5. as a primary review aid

Excellent	Good	Fair	Poor
47%	40%	10%	3%

Loop Film Trial

Review

Opinion Data Summary Sheet 3

Data is given in percentages with 52 students replying.

1. Did you like the loop films as a review aid?
   Yes 81% No 14% No opinion 6%

2. In which capacity would loop films work the best?
   a. as a primary teaching tool 2%
   b. as a review aid 54%
   c. as a primary teaching aid 44%

3. Which did you like the best for review?
   a. prosected fixed specimen 4%
   b. prosected fresh specimen 54%
   c. loop film 42%

   Why?
   1. Prosected fresh cadavers are more like the actual surgery, can feel the fresh tissue.
   2. Loop films are good for reviewing, bringing out highlights.

4. Were the loop films as easy, easier, or harder to understand than the prosected animals?
   a. loop films as easy as prosected 40%
   b. loop films easier than prosected 44%
   c. loop films harder than prosected 15%

5. Did you feel you learned as fast or faster from loop films?
   a. as fast from loop films 33%
   b. faster from loop films 50%
   c. slower from loop films 17%

6. Did you feel you learned as well from loop films?
   Yes 69% No 31%

7. How would you compare the loop films to active dissection (effectiveness and speed of learning)?
   Opinions varied though a majority felt there was little difference in the effectiveness. However 72% felt it was a faster method of learning than dissection and only 12% felt it would not be a satisfactory review aid.

8. Did loop films help you to correlate structure with function?
   Yes 92% No 8%

9. Do you consider loop films a novelty?
   Yes 21% No 79%

10. Comments!
    A concensus of the comments showed the students in favor of loop films as a review aid especially if it got them out of dissection. They felt they were excellent at correlating structure with function.